

THE RUSSIAN DINOCEPHALIAN *DEUTEROSAURUS*

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CONTENTS

	PAGE
Introduction . . .	233
<i>Deuterosaurus</i> . . .	233
<i>Mnemeiosaurus</i> . . .	235
Summary . . .	236
Acknowledgements . . .	236
References . . .	236

INTRODUCTION

In recent compilative publications in English, German, French and Russian the compilers Romer, von Huene, Piveteau and Orlov, in following the latest views of our Russian colleagues Efremov and Orlov, have added the weight of their authority to perpetuate some rather serious mistakes.

I have, during a four weeks' stay in Moscow, had the opportunity of studying the dinocephalian material housed in the Palaeontological Museum of the Academy of Sciences of the U.S.S.R. and feel that a preliminary note pointing out these errors would be welcomed by those who have not had the opportunity of seeing the material for themselves.

DEUTEROSAURUS

Orlov in 1954 gave a full account of all the material he considered warranted inclusion under the appellation *Deuterosaurus*.

This material consists of parts of two skulls, teeth and many postcranial bones of which there is little evidence of having been found in association. In fact, except in the case of some postcranial bones, there is definite evidence that they were not found in association. These separate finds have on various grounds been considered to belong to one and the same genus.

This lumping together started on its false course seriously when Seeley in 1894 described specimen No. 2 and identified it as a second specimen referable to Eichwald's type (No. 1) of *Deuterosaurus* and produced a composite drawing of a skull in which the type lower jaw, teeth and partial occiput were fitted to the distorted partial skull of No. 2 and associated with this some vertebrae, a femur, a radius, part of a humerus and scapula and parts of the pelvis. Eichwald's type specimen (No. 1) consists of a lower jaw from which the nature of the incisors, canines and postcanines as well as that of the upper incisors and canines can be determined and fitting on to this are the posterior part of the lower jaw, suspensorium, parts of the occiput, braincase and subtemporal and suborbital arches.

This specimen (No. 1) constitutes the type of Eichwald's *Deuterosaurus biarmicus*.

The Diagnostic Characters of the Genus DEUTEROSAURUS:

1. Dental formula: $i \frac{5}{4} \quad c \frac{1}{1} \quad pc \frac{1 + ?}{6 + ?}$
2. Incisors and canines of the upper and lower jaws intermesh.
3. Lower canine passes outward of upper jaw margin.
4. Incisors fairly long, with slight lingual step, unequally developed in the different teeth and separated from the talon.
5. Postcanines with bulbous spatulate crown; series short, probably not more than 8.
6. Quadratojugal no longer a bone of the outer lateral surface.
7. Quadrate posteriorly situated and lower jaw long.
8. No boss on the angular.
9. Slight indication of upward sweep of the premaxillaries.
10. Snout probably higher than broad.
11. Infra-temporal bar fairly weak with deep temporal fossa.

Taxonomic Position of DEUTEROSAURUS:

It is evident that the type is poor and important diagnostic features are not preserved.

Of the determinable characters none are typically tapinocephalian, but rather represent a mixture of anteosaurian and titanosuchian features.

The anteosaurian features are:

- the short series of bulbously spatulate postcanine teeth;
- the fairly long incisors, but the lingual step is more pronounced than is usual in the better known anteosaurians;
- the medial shift of the quadratojugal, which is no longer a lateral surface bone;
- the slight upward sweep of the alveolar border of the premaxillaries;
- the snout probably higher than broad;
- the weak infra-temporal bar and deep temporal fossa.

The titanosuchian features are:

- the intermeshing of the upper and lower canines with the lower canine passing outside the upper jaw;
- the absence of the angular boss and the general little pachyostosis.

I would thus place *Deuterosaurus* in a separate family—Deuterosauridae—in the Infra-order Anteosauria.

Postcranial Bones referred to DEUTEROSAURUS:

The femur is represented by a number of specimens (Nos. 59, 13, 1/1326, 294/20, 72). All indicate a slender curved femur quite distinct from the femur of both Tapinocephalia and Titanosuchia, but strikingly similar to the few known femora of the South African Anteosauria.

If the type jaws of *Deuterosaurus* are, as I am convinced, anteosaurian and the femora also anteosaurian it may very well be that the above specimens are correctly referred to *Deuterosaurus*, but they could equally well be referred to one or other of the other known Russian anteosaurians as e.g. *Titanophoneus*, *Doliosauriscus*, *Syodon*, *Admetophoneus*.

The distal end of a humerus (No. 33) and the tibia (No. 86) also appear to be anteosaurian.

MNEMEIOSAURUS

Specimen No. 2, which Seeley (1894) mistakenly referred to Eichwald's *Deuterosaurus*, consists of an incomplete and distorted skull from which few diagnostic features can be determined.

Diagnostic Characters of the Genus MNEMEIOSAURUS:

1. Dental formula: $i \frac{?}{?} \quad c \frac{1}{?} \quad pc \frac{1 + ?}{?}$
2. Crown of postcanine tooth spatulate.
3. Intertemporal width small, with high and sharp parietal crest flanked by the postorbital.
4. Anterior to the temporal fossa proper there is a sloping surface, below the level of the dorsal surface proper, which is formed by the postfrontal, frontal and postorbital (cf. *Phthinosuchus*).
5. Pachyostosis moderate.
6. Skull and particularly the snout, high and apparently short.
7. Orbit large.
8. Postorbital bar slender, but forming a wide flange of bone forming the posterior bony face of the orbit (cf. *Phthinosuchus*).
9. Vomers narrow, choanae short.
10. Pineal canal of moderate length.
11. Lacrimal with antero-dorsally directed process as in *Ulemosaurus*.
12. Vomers narrow and vaulted as in primitive gorgonopsians (*Phthinosuchus*), but posteriorly spatulate.

Mnemeiosaurus, on the scanty evidence, is difficult to place taxonomically, but is probably a tapinocephalian as suggested by Nopcsa. The presence of a canine indicates a primitive form but otherwise it appears quite specialised.

Provisionally it may be placed with the moschopids, where a form like *Avenantia* also has a narrow intertemporal region.

Teeth referred to DEUTEROSAURUS:

The teeth numbered No. 3, 4 and 5 and figured by Efremov (figs. 19, 20, 21) were not found in association with either specimens No. 1 or No. 2.

They are quite distinct from the incompletely preserved incisors of the type of *Deuterosaurus* (No. 1) and no comparison is possible with the one incisor root preserved in *Mnemeiosaurus* (No. 2).

The teeth in *Deuterosaurus* (No. 1) are slightly modified anteosaurian teeth. Tooth No. 4 approaches most nearly to the incisor teeth of the Tapinocephalidae.

Teeth No. 3 and No. 4 may very well be of a form very close to *Ulemosaurus*.

The incisor teeth hitherto considered as deuterosaurian are thus really typical of the Tapinocephalia and the real deuterosaurian incisors are really anteosaurian incisors.

SUMMARY

The Russian dinocephalian *Deuterosaurus*, is discussed after study of the material in Moscow and it is shown that some material has been erroneously included in this genus. It is considered that the type species, *Deuterosaurus biarmicus* Eichwald should be placed in the family Deuterosauridae, in the infra-order Anteosauria. *Mnemeiosaurus*, which was referred to *Deuterosaurus*, appears to be a tapinocephalian which might be placed provisionally with the moschopids. The true affinities of postcranial bones and teeth that had been referred to *Deuterosaurus* are considered.

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